

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

JAN. 29, 1951

\$6.00
A YEAR



The ALBATROSS knows no Scene or Season

Any time may find the GRUMMAN ALBATROSS anywhere . . . over warm Pacific waters or at icy arctic altitudes. Designed for air rescue and other activities on the open sea, this big Air Force amphibian has earned a remarkable record for saving lives during its first year of operation.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, L.

Contractors to the Armed Forces

On every B-36



THE HYDRAULIC DRIVE THAT MAKES CONSTANT FREQUENCY AC POWER PRACTICAL

● This Sundstrand Allison Drive is making aviation history! Its unique

ability to efficiently transform the widely varying speeds of the airplane engine to constant speed for driving the Allison makes low weight, high efficiency, constant frequency, AC power available in the air for the first time. On the B-36, this contributes to reduction in weight of the electrical equipment enabling possible longer range and increased bomb loads.

To take an extensive background of experience in hydraulic mechanisms plus applied research on control components, bearings, metallurgy and fluid dynamics to successfully design this transmission. This was coupled with precision tool engineering and actual production experience to meet the exacting requirements of the B-36 application. The same reliable research, expert engineering and precise production techniques are available for the solution of your hydraulic transmission problems.



SUNDSTRAND HYDRAULICS

SUNDSTRAND MACHINE TOOL CO.
HYDRAULIC DIVISION, ROCHESTER, N.Y.

AIRCRAFT AND INDUSTRIAL HYDRAULIC TRANSMISSIONS • PUMPS, MOTORS AND VALVES • OIL BATHS, PUMPS • AIR BATHS
LATHES, MILLING, SHAPING AND SPECIAL MACHINES • RESEARCH TOOLS • HYDRAULIC CRACKS

B.F. Goodrich



Sealed lips hold the secret of faster maintenance

Every time an airplane's landing is removed for overhaul, the flap and—long strip of control fabric between wheel and wing—but in some off the flap detaching the seal on some of the biggest planes was a headache. The seal, up to 60 feet long, were fastened by screws along their entire length. And removing these hundreds of screws for every wheel maintenance job was up a lot of men hours.

Engineers at Goodyear, who were working on an alternate seal for the B-36, had an idea that B. F. Goodrich engineers might have developed a better way

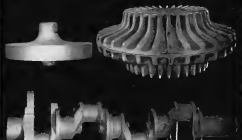
of doing their kind of sealing job. They had. It was the Pressure Sealing Zipper—a zipper made with sealed rubber lips along its entire length.

Put into service on B-36s the zipper with sealed lips did the job. The time-consuming job provided a 100% effective seal against air pressure. And covered it completely removing one screw also no longer detach the flap and mechanism was simply one step. And it's a new design is installed, the zipper needs no study to joining a unit being on a main job.

B. F. Goodrich Pressure Sealing Zipper can be used to any kind of

sewing, can be used for light or heavy service. They save weight and space. They fit snugly around any shape, can be converted into other fabric or metal. Typical applications include control surface seals, air ducts, airplane doors, instrument covers. To get the help of B. F. Goodrich research and engineering with your problem, write The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.

B.F. Goodrich
FIRST IN RUBBER



Wyman-Gordon—specialists in the vital forgings of the internal combustion engine since its inception—is today the largest producer of crankshafts for the automotive industry and of all types of forgings for the aircraft industry.

Be it crankshafts and other vital forgings for the piston type engines or turbine wheels and impellers for turbojets—there is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

WYMAN-GORDON

Forgings of Aluminum, Magnesium, Steel

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS

DETROIT, MICHIGAN

NEWS DIGEST

DOMESTIC

Cost of living allowances totaling \$230,000 for the next three months are being added to the pay checks of 53,000 North American Avian employees beginning Jan. 20, in line with the company's quarterly review of Bureau of Labor Statistics cost of living figures. The program was inaugurated in October.

Exports of personnel-intensive planes under \$500 lb empty airplane weight by nine companies in December totaled 53 valued at \$121,267, compared with 42 valued at \$159,514 the previous month. Brazil was the top buyer, taking 66 planes.

Cessna RB-16D made a one-hour nonstop cruise of 51 hr. 30 min., believed to be the longest duration flight for any B-16 type. Route and distance flown have not been disclosed.

Ed. Gen. Lucien Norval arrived at Wiesbaden, Germany, to take over command of the USAF in Europe from Ed. Gen. John K. Grace, who has gotten the Turned Air Command at Langley Field, Va. Norval has been Acting Vice Chief of Staff, USAF, and is noted as an avial strategy pioneer.

Bernie Stenwigheiser made the first nonstop C-97 flight between Hickam

AFB, Hawaii, and Kelly AFB, covering the 3600-mi. trip in 11 hr. 16 min. carrying 61 patients from Japan at an average speed of 327.2 mph. The plane landed with a reserve of 1175 gal. in the tanks.

Fairchild Engine division strike at Hightstown went into its fourth week with no settlement in sight. Computers were time lost would have placed last year C-119s in Korea.

Douglas DC-6B deliveries to UAL and American start only next month. AA plans to hire 14 as service by April. UAL expects eight planes this year and 12 next year.

Avco Lyfiter four-manjet from Toronto to Jacksonville, Fla., approximately 900 miles, in 2 hr., 50 min. Flame was in constant in 50 min. for seven engine tests before returning to Toronto.

Westinghouse J-40 has passed 150-hr. qualification test making it eligible for production. Started for a series of new Navy planes designed to take advantage of its tremendous power (believed well over 10,000 lb thrust with afterburner), the J-40 has automatic electronic control system and standard dual ramjet combustion chamber.

Our Expanding Industry...

Northrop Aircraft, Inc. is making more orders to fulfill increased demand in its F-89 Scorpion all-weather fighter. A new letter of intent for a "substantial additional number" of F-89s has been received Northrop's backlog to approximately \$150 million.

Rohlfen-France Corp. has gotten design and aircraft production work a new subcontract from Lockheed to build fuselage sections of the T-40 K-10, Calif., plant.

KF is the seventh large Lockheed subcontractor. Other Rock, Gross, Chance Vought, Toney, Rohr, John.

Rockwell Aviation Corp. has bought the Ford Motor Co. plant at Hamilton, O., for production of aircraft parts and components. Plans this will be a new Ford in division, the 16th, and employ approximately 2000.

Pilco Corp. has received what is claimed to be the largest microwave

communications equipment order issued by the Materiel Command. Boeing Aerospace Co. will produce its Model 902 lightweight 175-lb gas turbine engine for the Navy's Bureau of Ships. Engines will be used to supply electric power for radar receivers. Boeing has been testing the engine on low-duty trucks and in a Navy boat. The B-57s and now give the engine safety a real try future.

Adams division of General Motors officially announced receipt of a Navy production order for its T-40 turboprop engine (Aviation Week Jan. 11).

Lycoming division of Avco Mfg. Corp. is leaving the former Chance Vought plant at Stratford, Conn. for manufacture of Wright R-1100 and R-1150 engines. The engine power the T-28 AF training plane, and several helicopters. Lycoming has had an unusual mobilization study contract on the R-1100.

NEW

**ROTOR®
LOAD SENSITIVE
ROTARY ACTUATOR
with
ADJUSTABLE
POSITIVE
STOPS**



Here is One of the most complete, compact, sensitive, positive stop rotary actuators—made in the U.S.A. The R-140 and R-190C is a totally new design for valve or damper operation. Components and high weight (check mass than one pound) made in an assembly which opens or holds in a fixed.

Quick switches are load sensitive and adjustable for set value up to 50 pound inches. Motion between travel limits is controlled by manually or positively positive stops (check mass) made in an assembly which opens or holds in a fixed.

Operating on 35 mdc D.C., the ROTOR® is available in two models, one of which can incorporate either a pressure-sensing component or an electromagnetic position switch. Both models are available for compliance to specifications AN 9449 (Metric and British), including Rotor, USAF-1160 (Environmental for engine control), and USAF-1161 (General Motors-Motors-Aviation Specifications).

Write for Bulletin 128.



Washington Roundup

New Harry Hopkins?

National Security Resources Board chairman, W. Stuart Symington, may become President Truman's "Harry Hopkins." He's Presidential adviser, he states. Right now NSRB is being stripped to skeleton status by personnel and functions are going over to Office of Defense Mobilization, under Director Charles E. Wilson—with Symington's blessing.

Sen. Charles Tobey, aiming to clarify the new defense departmental setup, quoted Wilson: "And where's Mr. Symington's place in the mobilization picture? You are in charge of it. What is his relationship to you?"

Very funny. "Wilson seems deeply eager for direct action. He's 1000 miles, United States, 1700 miles, James V. Forrestal, miles in design for it will have a range 'substantially, exceeding' those contemplated for the United States."

Kaiser's Secrecy
The Senate's Banking and Currency Subcommittee, headed by Sen. J. William Fulbright, isn't kind for secrecy of Kaiser-Fraser Corp. negotiations with Reconstruction Finance Corp., and so last week.

The \$14-million loan for the concern in 1949 was made "after preliminary secret negotiations. After it had been made, the public interest which it served was seriously questioned. It would have been helpful to the RFC function if the agreement had been made and had been in their disposal when the loan was under consideration."

\$87-Billion Defense Program

The armory have now budgeted an \$87-billion defense program for the period from Jan. 1 to June 30, 1952. This is the amount that will be appropriated and accounted.

The outlook is that a slice of from \$200-\$300 billion will be for aircraft procurement.

Last of Second Supplemental funds, some \$1 billion, is now being committed. The Third Supplemental, which will go to Congress within a month, will add \$50 billion to the year's outlay. The 1952 fiscal year budget sets \$62.5 billion for defense, and there will be \$11.5 billion for European military aid.

Expenditures during the year-end-half period will be in the neighborhood of \$60 billion. That means the planned peak in military might won't be reached until the end of 1952.

The program may reach \$90 billion—or over. Defense Department's outlays, Assistant Secretary W. J. McNair, commented: "The \$87 billion for the 1952 fiscal year is a little on the low side. Don't hold us to that too strictly."

Diversity of Supply

Washington will be down on manufacturers to have at least two sources of supply for all materials and parts. This should assure against production stoppage if one source is cut off through labor trouble, accident, bank attack.

Private contractors will soon be asked to furnish period reports on subcontracting, to encourage leaving out of work over the economy.

Navy's Strategic Role

Navy's fleet-building career, scheduled as complete in three and a half years, points to an end of USAF's monopoly on strategic bombing. It will be a "secondary" role of the Navy. House Armed Services Committee's

chairman, Roy C. Wilcox, commented on the prospect: "I don't think that any one branch of the armed services should have a monopoly of the use of any particular weapon." And, if the Army can develop long-range atomic guided weapons, it too should participate in the strategic mission, he suggested.

This is how the new \$7,000-ton carrier, to be called the James V. Forrestal, compares with the proposed 65,000-ton United States whose construction was canceled, and the 45,000-ton Midway-class carrier:

•Displacement: 940 ft. long and 105 ft. wide. James V. Forrestal, 1099 ft. long and 133 ft. wide. James V. Forrestal, 1020 ft. long and 121 ft. wide.

•Maximum speed: 30 knots for Forrestal; 33 knots. Midway, 1000 miles, United States, 1700 miles, James V. Forrestal, miles in design for it will have a range "substantially, exceeding" those contemplated for the United States.

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Negotiations for the \$25 million additional loan last December "were also conducted in secret until the point had been reached at which public disclosure could add little value to the negotiations. This loan was executed through the RFC in the first days of negotiations with great confusion and little objective appraisal. One of the principal arguments for the new \$25-million investment was the contention that it improved the quality of the existing \$44-million investment. This is a process which could go on indefinitely."

Sen. Lyndon Johnson's Preparedness Subcommittee is now looking into a move to give Kaiser-Fraser a USAF place contract—openly to "improve the quality" of the B-36 bomber.

Fullbright is working legislation requiring a public docket of all RFP loan applications to take the secrecy out of negotiations.

Here and There

•Research and Development Expenditures will be almost exclusively for procurement of test equipment. This is in line with the policy of concentrating on projects which require operational use as a first step.

•Training plans. Neither USAF nor Navy will procure any for "the next four to five years," Assistant Secretary of Defense W. J. McNair. One prototype can be purchased.

•Bombers MIG-17 fighter. It has shown superiority in Korea to the F-80s and F-81s but there are operations there. NSASAF's program, but the F-46 will perform it. "We're in serious shape" in USAF's strategy. The difference: the group includes operational and support aviation only, the wing includes both, plus medical units, motor pools, etc., to make it a complete substructure.

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JANUARY 25, 1951



AF Studies Douglas Design for B-36 Role

New interest shown in year-old proposal as USAF again seeks new big bomber.

A third, tentative, undecided order for the forthcoming new USAF intercontinental bomber order is challenging the B-36. The new bomber is being designed by Douglas Aircraft Co. for the Air Force.

The Douglas specifications call for a craft with a gross thrust weight of 122,000 lb., combat altitude range of 11,000 miles, range, combat radius of over 15,000 mi., and speed in excess of 450 mph.

Douglas' proposal was made about a year ago, shortly after plans to shelve the proposed XB-52 production was announced by the Air Force. The XB-52, General's report was B-36, and the Douglas 1215-1 was moved into the program. The USAF is now developing it as a result of the winning of the intercontinental mission.

Subsequent modification of the program, Douglas' strategic bomber proposal have been covered with great interest by USAF bomber design staff agencies both at the Pentagon and at Wright

Patterson AFB, Cal. Engineering offices at Wright Patterson are reported to be working additional engineering studies for the Senior Officers' Board in Washington. Request for detailed design specifications will go to Douglas within

the next few days, it is reported. •Point Counter Point—Flying performance of new jet and rocket-powered interceptor has created a need for a new spec, higher flying, longer-range bomber. Phase out of the present B-36 program because of the interceptor threat is already scheduled by Air Force officials.

Phase-out of the B-36, scheduled for late 1953, will find an operational loss of more than 200 of the giant bombers with the Air Force.

•Other Considerations—Already under consideration by the Senior Officers' Board are:

•Douglas XB-52. In appearance, the B-36, but the long-range heavy bomber contract greatly resembles configuration of the six-engine B-36 as produced at Douglas' Wichita plant.

Though somewhat smaller than the present ten-engine B-36, the XB-52 is designed to meet the same strategic bomber requirement capability of carrying 10,000 lb. of bombs 10,000 mi. •Performance for the XB-52 is eight jet engines, plus jet, two in a pod, under each wing. Wings and tail are swept back at a 75-deg angle.

•General complement is reported to be one, including relief crew personnel for long-range missions. Two pilots were ordered by USAF for 1952 delivery, but schedules have been stepped up and reports are that the turboprop version will be in flight test late in 1951.

•General complement B-36. Considered by the Senior Officers' Board for two modifications, both of which feature increasing design of the present B-36 to meet new Air Force strategic bomber requirements. One proposal is a turboprop, the other a turbojet.

Final configuration of the new and production B-36 would change greatly in both.

•Douglas' design team substantially the same, but wings and tail are swept back.

The plan's tail wings are moved and given a low angle of attack. General production B-36 has previously been changed in its internal structure.

Engines of both General proposals are using as auxiliary below the wing. Turboprop configuration includes provisions for an auxiliary tank in single pods, four under each wing. Turboprop proposal includes provisions for 11 jet engines, plus two in a pod, three pods under each wing.

General's top priority proposal is for its turboprop version, but industry sources believe that a turboprop version will be first to give the company's performance data for the planned turboprop version. This will also give turboprop engine and propeller comparisons additional time to

Debate: Prop vs. Jet for Troop Support

In the course of his coverage of the Korean action for *AVIATION WEEK*, *Alfred W. Jones*, McGraw-Hill World News correspondent, analyzed the question in its initial aspect as seen by Air Force and Army and Navy officers. These reports appeared in the Oct. 2 and 6, 1950 issues. *AVIATION WEEK* then included a letter from a Navy commander aboard an aircraft carrier in the Pacific. Both the letter and Mr. Jones' reply covered such fundamental issues that they are of special interest at this time.

The Commander Argues . . .

I have read with interest your article in *AVIATION WEEK* (on the support rendered our troops in Korea by jet fighters). I would like, if I can, and as an individual, to state a point that may be of interest to you. It is in connection with the requirements for close-support aircraft and the belief, apparently held by some, that such aircraft must be jet-powered. The airplane, most, it would seem, be able to "live" in the air against enemy jet aircraft and "have a fair chance to fight off or out-fight the best the enemy has." The logic of this escapes me.

These premises, with which I cannot agree, apparently stem from an inability or an unwillingness to distinguish the close support problem from the air superiority problem. The requirement for a jet fighter bomber is the opposite result.

Seek a requirement well, I believe, result in a product that is a hybrid, neither the best fighter nor the best close-support aircraft. As a fighter, like the "hang-on" aircraft, it will not have the performance really to stand up against a pure fighter, or, conversely, as a close-support aircraft it will not operate as effectively nor as efficiently as will an aircraft tailored specifically to the close-support mission. Moreover, the jet fighter-bomber must operate at a considerable height, expense, consume fuel, and its fuel requirements but also the construction of appropriate airfields. As you have noted, these problems become increasingly important in the forward areas.

Local air superiority, adequate though not necessarily complete superiority, must normally be attained prior to troops being put ashore as in the field. This should be achieved by the use of the aircraft best suited for the purpose—the pure fighter. The strategic bomber and the tactical fighter may of course contribute indirectly to this necessary condition of air superiority. Conversely, we may at times find our security engaged in areas where we do not have air superiority. Certainly then, if ever, we will not wish to employ unadorned fighters, fighter bombers, but doing fast fighter jets, must get an entry in the field designed to do the job properly and capable of achieving control of the air. When that is achieved the industry should be given the best possible close support consistent with the importance of reasonable logistic demands upon the other services. The jet fighter-bomber does not, as you said, fit any place in that picture. I believe an airplane of the type of the Douglas AD does eminently fulfill the close support requirement. Any airplane that we cannot afford both types, the fighter and the close-support aircraft, does not, I believe, stand up under logical analysis.

As you are aware, the Navy has in the past used the Corsair with her success as a fighter-bomber (though I am positive that in average hands it is not as accurate a bomber as the AD). That was possible, I believe, not only because of the caliber of the equipment but also because of a fortunate circumstance in the evolution of the airplane—one that is not likely to occur again.

In passing, do you know if any Air Force officers have

Mr. Jessup Replies . . .

Your letter highlights what I consider one of America's greatest needs: an accurate through criterion by our best recognized experts of the necessary development in American weapons in the light of the losses and casualties of the Korean war. There are already indications that occasional but half-considered analyses of an aircraft may lead to into difficulties. Unless we carefully consider what we are going, I believe it is possible that American military power may be seriously crippled by a waste of our resources in the construction of too few of too many types of combat aircraft.

Before anyone fairly stresses that this is that does or does not fit into our military aircraft picture, I recommend that he consider these points:

- (1) Jet aircraft can provide close support for infantry. The F-80 performance in Korea has given proof of this.
- (2) According to the standards and grounds here it is unlikely that we will ever have anything approaching complete air superiority in the RGC war if it comes. Even without this (we owned the air) any assumption that we would have such superiority would be foolhardy.
- (3) In the RGC war, close support aircraft probably will be under heavy air-to-air attack and must be strong jet fighters. It would be seriously that we would lose close support with slow moving aircraft stopping for hours over the battle lines waiting to be killed in by the ground observers. It would be a foolhardy adventure, and I believe we can safely call it a suicidal risk.
- (4) Jet aircraft offer possibilities for overcoming these difficulties. Jets on ground alert at airfields 100 miles behind the front line could attack enemy positions within 15 minutes of being called up by the forward tactical control stations. They could strike at high speeds, repeatedly with only a small risk from anti-aircraft fire or so attack. Enemy ground interrogations reveal that F-80s usually hit before the enemy ground units know they were in the area, and were gone before any accurate counter fire could be adjusted. "Stinging" aircraft have to use what they have before.

(5) Korea has revealed an appalling shortcoming of the Army in maintaining the logistic services essential for capturing close-support aircraft. In World War II, the engineers built 3800 ft. runways in five days. They haven't completed one in Korea in less than two months. In World War II, fuel pipe lines partially buried from the soldier's hands to the airfields. Not one has been put in Korea. Communications have been at least as poor.

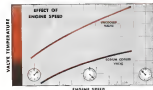
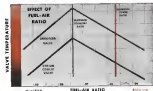
(6) Developing aircraft to compete with any potential enemy requires parallel development of bomb sights and control devices. There's no point in having the "fourth" version planes, if we are going to slow them down to World War II speed and efficiency with only "fourth" Century bomb sights, etc. I believe it would be playing fast and loose with our resources to continue building yesterday's planes as an alternative.

Why Sodium Cooled Valves?

The trend of modern engines is to operate at higher speed and more economical fuel-air ratio. In considering factors which influence exhaust valve life, temperature is the dominant one. High temperatures sharply reduce the resistance to corrosion, distortion, and fatigue life of the finest alloy steel. The effectiveness of sodium cooling in reducing valve

temperatures is shown by the curves below, which are typical of recorded test data.

The curve "Effect of Fuel-Air Ratio" shows that as the mixture is leaned out to obtain maximum economy, valve temperatures rise. The curve showing "Effect of Engine Speed" indicates that temperature rises quite rapidly as speed increases.



Eaton engineers will welcome an opportunity to discuss the application of Eaton sodium cooled valves to engines proposed or now in design.

VALVE DIVISION • 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

no MYTH

...to controlled electrical power



The legend of TOSOL—applied power that flows not concerned in its character as a fluid of thought, is better to be used in a laboratory. It is a self-regulating, self-contained power, which will in major business which has been used in the world, making a mighty discharge of lightning and thunder.



... the modern may have had to follow

In myth and magic to explain the wonders of electrical power. There is no myth or magic about EICOR's development of electronically controlled inverters. It has been proven from laboratory reports, tests in the field and thousands of actual flying hours that by sound, imaginative engineering, we have produced dependable, accurately controlled power conversion equipment to meet the most stringent of specifications. By designing and manufacturing a wide range of inverter sizes, we can now offer the aircraft industry in complete power conversion systems. We will, specify an EICOR Electrically Controlled Inverter in the catalog to your toughest power conversion problem.

Basic inverters are designed for conversion of 26-27 volt DC and 120-130 volt AC input to 110 volts AC output, single or three phase, 400 cycle power.

REPRESENTATIVES THROUGHOUT THE WORLD

EICOR INCORPORATED

1501 West Congress Street
Alhambra 7, Alaska



• PIONEERS IN ELECTRONIC CONTROLS FOR AIRCRAFT POWER CONVERSION EQUIPMENT •

PRODUCTION

Allison Gets Big Jet Parts Order

Negotiated contracts totaling nearly \$10.9 million as issued by the Air Force for the week ending Jan. 12.

Leading the list of negotiated awards is the Allison division of General Motors Corp., Indianapolis, for turbojet engine spare parts.

Allison Instrument Corp., Lansing, Mich., microelectronics, CI 508, 295,515.

Aero Supply Mfg. Co., Inc., Corp., Pa., aircraft parts, CI 044, 210,161.

Alt Associates, Inc., Treforest, N. J., air tank containers, CI 044, 210,161; aircraft hardware, CI 948, 217,630.

Aluminum Mfg. Co., Los Angeles, spare parts, CI 982, 240,348.

Aluminum Corp., General Motors Corp., Indianapolis, turbojet engine spare parts, CI 022, 241,040.

Barnett Products Corp., South Bend, Ind., aircraft parts, CI 050, 212,556; turbojet engine parts, CI 050, 212,556.

Berkshire Motor Corp., Cleveland, turbojet engine parts and bearings, CI 092, 213,812.

David Clark Co., Inc., Worcester, Mass., aircraft parts, CI 018, 213,812.

General Motors Corp., Indianapolis, Pa., aircraft spare parts, CI 214, 248,031.

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General Motors Corp., Indianapolis, Pa., aircraft spare parts, CI 214, 248,031.

N. J., aircraft parts, CI 11, 214,181.

Johnson, Instrument, Spent D. Co., Elmhurst, N. Y., power accessories, 552, 315, turbojet engine, CI 052, 264,312.

K. Leighton & Co., Chicago, commercial equipment, CI 916, 229,626.

Marine Products Co., Inc., Longwood, Calif., aircraft steel clamp assemblies, CI 044, 211,539.

McDonnell Douglas Corp., Elkhart, Ind., steel rivets, CI 218, 244,400.

Miss Safety Appliances Co., Pittsburgh, Pa., fire fighter protective hoods, CI 158, 214,031.

New Departure, div. of General Motors Corp., Detroit, Commercial, fuel bearings, CI 092, 213,812.

W. H. Nichols Co., Waltham, Mass., aircraft steel parts, CI 036, 241,472.

O'Brien & Smith Co., Los Angeles, aircraft parts, CI 018, 213,812.

Republic of the University of Michigan, Ann Arbor, Mich., fuel spare parts for jet engines, 542,036.

Scholar Products Corp., MI, Vero, Ohio, burner material, CI 4, 213,490.

Shelton Hardware Co., Cincinnati, air vent hydraulic pump bearing material, 212, 112.

Shuman Motors Corp., St. Marys, Ohio, aircraft parts, CI 46, 219,030.

Sherman & Co., Inc., Stamford, Conn., power units, CI 092, 249,030.

Tiretension Corp., Hightstown, N. Y., bearings, CI 184, 213,812.

Tallman Oil Tank & Pump Co., Ft. Wayne, Ind., tank parts, CI 12, 215, 312.

Western Electric Co., New York, transformers, power, CI 102, 212,583.

Westhouse Electric Corp., Dayton, emergency 180 percent inverters, CI 47,236.

Workers, Not Americans—in 1960 employees are "workers"—not "union" etc.—They are turning out \$15 mil. loss of aircraft accessories and tractors. Inexpensive motor a year. By next May, they'll be turning out a jet motor—up to an estimated 130 million annual volume. Probably 600 more employees will be on the payroll by then.

It won't do with Air Force contracts. Even before Korea, JSH was doing all right.

"I have no concern about the future," Kolontsow said. "The company is on its way."

But this time it won't be turning losses, just losses and losses a dry prelude to JSH. Despite the fabulous loss of production that JSH did for World War II, his last year before a regular job's work of applied, de-motivated workers who had a hard time getting back to work.

So Kolontsow has wisely kept JSH's usual ideas, and decided that 1971—he takes JSH on its own side to progress. Within the next year JSH's efficiency has been lifted from 50 percent to 70 percent.

The new JSH's 1971 achievement is a 15-year old Glenn H. Edwards, plant superintendent, one of the many "young leaders" on Kolontsow's team.

"Production Week-It is responsible for two of the chief differences between the present situation and 1950 percent of all output now and that of World War II—extreme precision, and the best that modern technology could do as turned out."

JSH is concentrating on aircraft engine accessories, inverters, generators and some spare parts for the new pilots' training aircraft.

Edwards explained that Kolontsow in the machinery are about one-third of the diameter of a human hair—most emergency 180 percent inverters, of all critical dimensions, something like industries' custom of accomplishing. He said the plant is now making 15 aircraft models. 3 special models, 11 in various, five generators, plus various "accessories"—the focus of a generator.

JSH has nearly 500,000 worth of new machine tools on order.

Talbot G. Hertz, a co-founder with JSH & 1948, is still directing his own moving talent and genius. Talbot is three-quarters of his time to JSH's loss in his home in California. The two personal managers, Mr. Kolontsow and JSH, are also on the board of directors.

Others on the Kolontsow team are O. T. (Ted) Hertz, vice president and secretary, and William D. Hertz, formerly with JSH & 1948, is now in the JSH team. Hertz acts as right-hand man. He and Kolontsow were first associated at Westinghouse Electric Corp. in Mansfield, O.

MICRO SWITCH Announces Two New Enclosures for AN3234-1 Switches

These new precision, lightweight, well-sealed switches with rotary actuator are designed especially for the rigid seal existing requirements of aircraft use.

The rotary actuator arm is adjustable through 360° in increments of less than 1/16th of a degree, with switch operation in either direction. Other features include protection from dust, dirt and splash, easy wiring accessibility, not contact coupling AN3234-1 and easy mounting.

The switch units in these assemblies are MICRO

V3-1 single-pole, double-throw switches that conform to Aircraft Specification MIL-S-6743, drawing AN3234-1. Rating of 28.5 volt a-c, 10 amperes at 30,000 feet, or 10 amperes at sea level. Mounting are rugged de-ice situations warranted enclosures.

MICRO has a complete line of precision slip-ring contact switches which conform to Specifications MIL-S-6743 and MIL-S-6764 and rotary switches designed to conform to AMM-65. Call or write MICRO SWITCH, Inc., for details, or contact the nearest office nearest you.

MICRO...first name in precision switches

MICRO (V4) precision switch with one AN3234-1 (MICRO V3-1) switch enclosed. Single-pole, double-throw contact arrangement.

MICRO (V4) precision switch with two AN3234-1 (MICRO V3-1) switches enclosed. Double-throw contact arrangement. Single-pole, double-throw contact arrangement.



MICRO SWITCH

PRECISION SWITCHES

Call (214) 646-6666 for details

MICRO Precision Switches

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

Fuel Boil-Off Data

FUEL	Initial Fuel Temp	Pressure had lost (boils in 10 min) (lb/in. sq. at 10,000 ft. alt.)	Pressure required to increase loss at 10,000 ft. alt. by 10 percent
Type B—Wide Range	150°C (300°F)	0	1.5
Type C—Medium Range	110°C (230°F)	0	0.2
Type E—Gasoline	150°C (300°F)	0	1.1
		4.5	3.5

► **Clash Effect**—Rate of climb has a secondary effect. Heat seal Clashes the right conditions of ambient and relief of fuel volume in tank volume, a "supersaturated" condition can be built up leading to heavy foaming and boiling with bumping, followed by excessive carryover of the liquid fuel with the vapor and instantly dissolved air. Total loss as high as 70 percent have been recorded in the 10 miles these conditions, but it is not known how these tests would relate to actual flight. Even under the conditions it was found that the conditions of the most tank before any significant.

► **Vapor Pressure at Altitude**—Heat seal that the release of dissolved air under order conditions without superheating appears to be negligible as its effect.

The point out that the foregoing data suggests that release cannot be placed on the high volatility of a 5 to 7-lb. RVP fuel to compensate for inherent deficiencies in the vapor combustion system—because after some time at altitude, when stable fuel tank conditions have been reached, what was originally a 5 to 7-lb. RVP fuel has deteriorated to a 1 to 2-lb. fuel.

The secondary element that such bumping operations are much better done at the refinery.

Heat released to the vapor loss curves to show how effective fuel cooling would be if it could be done economically. He says it is expected to cost extremely in flight without severe weight and drag penalties. And ground cooling is not possible on a worldwide basis, although it does have compensation on the ground instead of adding them to the aircraft. Also, there are operational difficulties to be considered with the use of precooled fuel, such as delayed takeoff.

► **Permeation Factor**—Fuel loss with the vapor soluble materials can be so

dated by preheating the tank, heat seal, but with a weight penalty. Some of this remedy is shown in an accompanying table. Permeation loss is 5 per cent usually below the loss that a 5 to 7-lb. RVP fuel can be reduced to an acceptable figure. The degree of permeation, he says, would appear too practical because of the extreme weight penalty and complications involved.

Partial permeation to 2 psi would reduce the weight penalty to about 25 percent of that for the 5-lb. pressure, but the vapor loss with a 5 to 7-lb. RVP fuel with the degree of permeation is still considerably large, he believes.

He mentioned voluntary requirements by stating that fuels having final vapor pressure higher than 1 to 2 lb. are quite unacceptable and, in fact, only be used at the expense of considerable weight and performance penalties.

► **Fueling Point, Feasibility**—Concerning these difficulties, Hunt and his fellow engineers are working to block out with air crystals entering out of dissolved water, and also to blocking with solid hydrocarbons precipitated by low the freezing point of the fuel.

Study is underway, Hunt said, to determine in what degree fuels can be pumped below their normal freezing points. Severity of filter blocking would seem to depend very much on impurities of the filter, flow rate through it, and use of a solution of the solid material. Considerable hydraulic effects are anticipated, he said.

Fuel filters of the new specially sized with a 1000-lb. thrust jet have been found to pass about 1000 gal. of fully saturated fuel at -93 C. (-103 F.) before the pressure drop due to ice plugging becomes excessive. Therefore, Hunt said operational difficulties may not prove to be severe.

► **Fuel Boiling Out**—He said that tank boiling is expected except in a lot

"LOOK, SAM, MEETING TOUGH TEST SPECS IS NO PROBLEM NOW... EVEN..."



No. 41065-B

(M & A S)



The Tenney-Sperry Altitude Chamber shown here was built to run commercial tests on aircraft electrical components, in accordance with 41065-B. Conditions include Group 13 (high temp. limit, Group 12 (low temp. limit), Group 20 (low temp. limit) and Group 40 (high temp. limit). Specified range from -127° F. to +207° F. Relative humidity—20% to 95%. Altitude to 15,000 ft. Flow from 2 to 12 cubic meters.

Experiments, hard and practical, in the manner why Tenney can build test chambers to meet the toughest industrial and government specifications. Standard Tenney units accurately control relative humidity, altitude, explosion, proof, liquid immersion and other tests. These systems can be combined for complex conditions. Tenney precision control systems include safety in changing times and conditions, distance controls provide high precision regulation. For literature and further information, write to Tenney Engineering, Inc., Dept. 4, 24 Avenue A, Newark 2, New Jersey.

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Engineers and Manufacturers of Aircraft Temperature, Humidity and Pressure Control Equipment

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471 Cu in. Displacement
185 h.p. at 1200 r.p.m.

The fact that Continental aircraft engines hold all major performance records doubtless has much to do with the preference they enjoy. But at least equally important from the standpoint of owner and pilot is Continental Motors' unreserved acceptance of the obligations which that preference has imposed. This attitude is reflected in Continental Motors' maintenance of parts and service facilities wherever people fly. You may not have occasion to use them this trip, or next—but it's reassuring to know they're always there ahead of you, waiting to spend you on the way.



INTERNATIONAL FINANCIAL CORP. (INC.)

JOHN A. L. STODOLSKY, PRESIDENT

Continental Motors Corporation
Aircraft Engine Division
MUSKOGEE, MICHIGAN

are available in adequate quantities, but he says these must not be complete propeller systems with inadequate visibility at the expense of living sight of what is really required.

Civil requirements for gas turbine fuels can be met now, and in the few accessible future with known type A fuel, particularly if it is possible to use the freezing point to —45°C. (–10°F.)—he says. He feels that there is no such real reason why the freezing point should not eventually be brought down to the desired —65°C. (–79°F.).

►Continental's R&D—Hurst stated that it is the military aviation fleet at difficult to assess. The last war was fought with piston engines and the influence of fuel quality, particularly knock rating, on the possible power output and efficiency was clear, he said.

Unfortunately there is no single feature of a gas turbine fuel that is as clearly defined as is important in knock rating of a piston engine fuel. But Hurst feels that the combined penalty of high vapor pressure and low specific gravity (density, low volumetric calorific value) of the wide-range 5 to 7-lb. RVP fuel prohibits this use in gas turbines as ordinary as an 87 octane fuel would have proved useless in 1944.

The combined penalty now reduces the aircraft usage by as much as 25 percent. This is much more than the savings following the improvement in specific fuel consumption made possible by an increase in compressor ratio of a piston engine required from 57 to 160 octane, and the greater tolerable power which enabled large fuel tanks to be carried.

►Compassion—For the immediate future, Hurst said, as at present at the requirements specifically mentioned above, by delivery of the fuel point limit, provides the best compensation to brace ourselves in service and availability, though special considerations may be needed for handling and in ground storage. Considerable doubt was expressed some years ago about the role of handling 1 to 2-lb. RVP fuels, but Hurst pointed out that large quantities of kerosene of this vapor pressure were moved long distances during the last war, without trouble.

Even if special precautions prove necessary, he said, some additional responsibility on the ground side is small price to pay for the maximum performance in the air.

►About—For the longer term future he believes that the full requirements of the characteristics previously mentioned must be met. The problem, he said, is much easier than the one which the petroleum industry solved in 1940 in connection with the introduction of 100/110 gasoline. And he said, the engine is in good

(Continued on page 37)

500 "O" RINGS TAKE WINGS!



TWA
TRANS-CONTINENTAL & NORTHWEST AIR LINES
4471 OAKRIDGE DRIVE, DAYTON, OH 45424
6000 Airline Building

Memorandum

TO: Mr. J. Edgar Hoover
FROM: Mr. J. Edgar Hoover
SUBJECT: TWA Constellation

Re: TWA Constellation aircraft engine oil analysis. The oil analysis results show that the oil is of good quality and that the engine is in good condition. The oil analysis also shows that the engine is running at a normal temperature and that the oil is being changed at the proper intervals.

Very truly yours,
J. Edgar Hoover
Director



"Seal" for 4-gallon oil can. Shows new seal from 200 "O" Ring. Sealing compound is applied to the seal and the oil can is sealed.

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IN
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AMERICAN sets the pace with the new DC-6B FLAGSHIP!



Once again—the fleet of the year is the Flagship Fleet!

To such famous Flagships as the DC-6—the favorite of transcontinental travelers—and the popular inter-city Convair—American now adds the DC-6B Flagship, even larger, faster, and more luxurious than the DC-6 itself.

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JOY[®] AXIVANE AIRCRAFT FANS

warm airborne troops before take-off

To protect our airborne troops in flight, warm them before take-off, Joy AXIVANE Aircraft Fans are installed in these huge compressors to blow heated air into the main cabin while the plane is on the ground. Heat effect is utilized for this purpose after the burner in the burner. Air from the fan is mixed with a heated stream of air from the burner to provide the desired air temperature in the duct. That, cold weather is no hindrance to the low, efficient transportation of our fighting men to any theatre.

This highly-efficient 1.5 H.P. fan produces 1100 CFM at 5.5" static pressure, net weight only 32 pounds and is only 9" in diameter. A & N design specifications. Superior features of all Joy Aircraft Fans are compact design, shock-resistant strength, minimum operating noise, and the most favorable air volume-to-weight and electric-to-air power ratios.

• Joy designs and builds each fan to the exact requirements for which it is needed. Each fan, therefore, is custom engineered for highest efficiency. For many purposes such fans can be installed from the engine to the already designed. But a single and a single case is available. Joy now has a wide variety of fan types, including, but not limited to, radial, axial, and centrifugal fans, including, but not limited to, radial, axial, and centrifugal fans, including, but not limited to, radial, axial, and centrifugal fans.

Here are some of the many uses for Joy AXIVANE Aircraft Fans: Windshield de-icing, windshield or wing de-icing, cabin heating, cabin ventilation, cockpit heating, ceiling cooling and electronic equipment, cooling voltage regulators, oil cooling, gear-box cooling, instrument cooling, air recirculation, and high-altitude pressure heating.

Write for Bulletin, or
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He feels that there is no doubt that a fan which acceptable to the engine and aircraft designer can be made in adequate quantities at the effort is expected. There is no reason why, in fact, for compressors which create difficulties in all aircraft and aircraft engines with various aircraft and engine development progress. Moreover, aircraft performance must be increased, he concluded.

High Heavy (Shell Oil Co.) presented views on the desirable properties of jet fuels, listing them in this order:

- Low cost and availability;
- Combustion efficiency and stability;
- Safety;
- Clean burning;
- Storable;
- Good low temperature characteristics.

Available, there is still, but apparently less emphasized, part in the U. S. does in Great Britain, and this has led to the fabrication of a specification here for a wide range fuel with a high vapor pressure.

Kerosene cannot be economically quenched from other fractions of crude oil, and the supply is limited by what occurs naturally. The amount represents about 5 percent of the total crude production under present circumstances, or a 1949 pint of about 12 million gallons per day. At best, this figure could be raised to about 30 million gallons per day, but as Henry pointed out, a small fraction of this amount would suffice for all concerned and jet aircraft in this country for some years to come.

But the petroleum industry is faced with the problem of getting itself to meet aviation fuel requirements in the event of a third world war. And the magnitude of that problem is tremendous.

• War II, 34 Percent-During World War II the peak rate of motorgrade fuel was around 26 million gallons per day at high octane, nearly 50 percent of the total rate of crude oil production. This quantity was enough to power 17,500 compressors against a 2000 hp. each for low heat end dry at a fuel consumption of 4 lb. per hp. hr. (Total dry hp., 300 million.)

If all these engines were 5000 hp. (Total 850,000 hp.), operating, low heat end dry at the same rate of about 10 lb. per hp. hr. at that, the daily fuel requirement would be 91 million gallons. This figure is nearly half the present crude production rate in the U. S.

This terrific potential consumption led to formulation of aviation specifications MIL-F-8624 formerly known as AN-F-58 and more generally known as JP-5, a mid-range petroleum fraction which boils between 150 and 600 F., and can utilize 50 percent of a barrel of crude oil as jet fuel.

FOR MAXIMUM JET POWER



Working on standards used by customers' rigid specifications, Ex-Cell-O is actively engaged in production of jet engine parts. This is but one of the latest developments in a long-standing program of service to the aviation industry. The result, speed, precision, or tolerance of accuracy every part produced in this country has parts made by Ex-Cell-O in production of Ex-Cell-O precision machines. Such wide acceptance speaks well for Ex-Cell-O quality.

Ex-Cell-O has complete parts production facilities, including rough and finish machining, heat treating, and metallographic control, all done directly under the responsible management. All these facilities are being utilized by the aircraft industry in its rapid progress in commercial and military jet power.

Below: Some typical precision aircraft parts made by Ex-Cell-O in equipment specifications.



EX-CELL-O CORPORATION Detroit 32, Michigan



Douglas C-124

North American A-1
Republic F-91



Common Denominator

WING-FLAP ACTUATORS BY WESTERN GEAR

There are some of the huge loads that "flap their wings" with Western Gear muscles. Wing flap actuators—small, precision gear units designed and built by Western Gear—are the one type of the mechanical power-transmission products that are our contribution to the nation's fast, powerful air arm.

Our fifty years of manufacturing experience and our skilled aircraft engineers are ready to serve the aviation industry in now and in power, with gears and ground products for aviation and ground installations.

For further information, or for copies of literature, Bulletin MW-1, or Aircraft Equipment Bulletin MW-2, write Western Gear Works, 1740 W. 19th St., Hayward, California.



Convair
XP557-1

Fairchild C-119

Convair 240

Lockheed
F-90

filter clogging is a very real problem. Besides, made by the industry, it is far superior than filter clogging is only present with certain American type fuels. (Hydrocarbons tend to freeze out in the form of wax and clog the filter element, the flow required for the drop-out, varying between fuels.)

► **Restartability**—Concentration of heavy type fuels always brings up the problem of restarting the engine. This restartability depends a great deal on the characteristics of the engine, and power since it is a function of velocity and pressure at the burner.

Thus, some engines can be started better by slowing them speed and allowing the heavier velocity to decrease thereby, and other engines can be restarted best by speeding up to increase the pressure at the burners by use. Secondary adjustment in restarting includes the quality system, how well the burner starts off even fuel and waste location with respect to plugs.

General conclusion is that the burner fuels are harder to start (slow start) but that by good engine design they can be started under all required conditions.

Rapid combustion of fuel requires perfect mixture of fuel and air in proper proportion. This necessitates the best possible atomization of the fuel, but this cannot be obtained with wet turbulence and gas currents.

A low boiling point fuel and high air temperature favor evaporation, and so does high air density, because of the high heat capacity of the air.

Desirability of low atomization is shown because the rate of heat absorption of the fuel depends on the area of its surface area, and the rate of temperature rise is inversely proportional to the volume of the droplets.

In order to provide good combustion over wide loads of fuel-air ratio, it is necessary to have fuel droplets vary in size with the fuel-air concentration gradient in the burner.

► **Nuclear Developments**—Development for that FFW was trying to develop fuel systems that will cover a 10:1 range of flow with a maximum permissible pressure drop of 300 psi. Fuel pump pressure provides a definite limit to this accomplishment in this way. Maximum compressor discharge pressure in a standard or high pressure turbojet is between 100 and 200 psi. Fuel metering is assumed to require another 100 psi pressure drop. If it is also assumed that 500 psi fuel pressure is available, that leaves only 200 to 300 psi fuel pressure drop for atomization.

If the pumps could operate at higher pressures, then better atomization would result. But higher pressure operation is a matter of manufacturing and lubrication, so far, quality jet are not

SPS AIRCRAFT FASTENERS



NAS INTERNAL WRENCHING AIRCRAFT BOLTS

... are made to meet NAS Specifications. Bolts are fully formed by rolling after heat treatment, an important UNBRAKO feature. Full range of standard sizes.



CLOSE-TOLERANCE, HIGH-STRENGTH SHEAR BOLTS

FLEXLOC

EXTERNAL WRENCHING NUTS

... incorporate the famous FLEXLOC self locking principle and one-piece, all-metal construction. The exceptional reliability of this construction has been proved by the safe use of FLEXLOC nuts in the aircraft industry.

Other outstanding advantages include: Maximum tensile with minimum weight. Approved under Inter NAS Specifications. Large bearing surface. Positive lock holding—"won't shake loose!" Temperature range to +325° F.

No special tools needed—can be checked 12 point contact or five wrenches. Designed for use in cramped quarters. Sizes from 1/4" to 1/2" AF Thread Series. Send for samples and information.



FLEXLOC

ONE-PIECE SELF-LOCKING NUTS

The one-piece FLEXLOC is both a step and a lock nut, due to its resilient segments which lock positively, even under extreme vibration. Torque is uniformly applied within a few inch pounds. "Thin" and "regular" types; NC and NF threads. Officially approved by many U. S. departments, airlines, etc., and CAA for aircraft use.



Write for further information on these UNBRAKO and FLEXLOC Products.

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Superior
Performance

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DOUGLAS DC-4



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CONSOLIDATED VULTEE CONSTELLATION 340

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**PAN AMERICAN
WORLD AIRWAYS**

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HYDRAULIC EQUIPMENT

Pan American World Airways derives a double advantage from the use of Vickers Hydraulic Equipment. First, it has the best aircraft hydraulic equipment available; second, it obtains the many benefits of standardization.

Vickers Hydraulic Equipment has proved by hundreds of thousands of hours in the air its claims of longer life, greater dependability, better performance and lower maintenance.

The interchangeability resulting from standardization makes it easier and more flexible inventory of spare parts. It minimizes the number of test and inspection failures, it makes for quicker and easier training of maintenance personnel through the need for familiarization with fewer products.

Ask for Bulletin 49-52 describing Vickers Hydraulic Equipment for Aircraft.

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ENGINEERS AND BUILDERS OF VEE
HYDRAULIC EQUIPMENT SINCE 1921

available that will operate at high pressures without adequate lubrication.

Kerosene-type fuel, Degeemaster stated, would greatly aid the problem of coordinating the pump, nozzles and burner.

► **Disadvantages.** Two—Although the heavier fuels are cheaper and more readily available, there are limits to the advantages to be gained. For example, titanium-based nozzle pressure are required for the heavy fuels in the case of some oil the figure is 15 times that required for the same flow rate of aviation gasoline.

Commercial Jet Fuel Properties

(Prepared by R. E. Degeemaster,
F & W)

Specific gravity at 60 F/60 F	0.732 max
Distillation temperatures, F	
10 percent evaporated	400 max
50 percent evaporated	600 max
End point	771 max
Lat. point	1.5 max
End point, percent	1.5 max
Viscosity, Centistokes	
at -40 F	13.0 max
at +100 F	0.16 max
Stability, percent	0.18 max
Grav. unrefined, lbs per cu in	5.5 max
100 vol. (24 hrs.)	
Residue, gum, wt per wt	0.8 max
100 vol	
Net heat of combustion, Btu/lb	18,000 min
BTU per lb	
Freezing point, F	-70 max
Aromatic content, percent by volume	20 max
Flash point, F	120 min
Copper strip corrosion	Stage 1
Water tolerance	0.05 max
Total acidity	0.40 max
Color shall not be darker than	+12 Saybolt
Distort one	Refractive

One nozzle will not give optimum performance for different fuels. Changing spray angle and drop size in certain, the change from aviation gasoline to JP-1 on a given nozzle configuration resulted in a 40 percent increase in maximum flow. (Maximum flow is based on the lowest flow at a given pressure for an acceptable nozzle spray, and spray has a direct bearing on the altitude to which good combustion efficiency can be maintained.)

So, it becomes obvious, he said, that maintaining good combustion depends on standardizing on a single fuel.

He then presented the characteristics of a commercial aircraft turbine fuel which was left to be the best balance that could be obtained for turbine-powered aircraft in their present form. He said the fuel is a good grade of number one stove oil or kerosene, and is the type of fuel, he said, that would be most satisfactory in F4U's T-34 engine in commercial operation.

AF Specifies Policy For Cadmium Parts

The Air Materiel Command's supply division has formulated new positive tests and packaging policies for numerous cadmium-plated parts to protect them in shipment to locations covering the world range of climatic conditions—tropical, arctic, desert, humid or moderate.

Manufacturers are required to treat with approved corrosion preventive compounds specified areas, such as assembly hardware and ground and bonding

equipment, having less than .0005 in. of cadmium plating.

Parts having precision surfaces and close tolerances are exempted. And for those where the preventive would be detrimental or difficult to remove, inactivate and vapor-proof containers, in which the enclosed air is dehydrated, must be used.

Items to be included in the category are electronic equipment, instruments and comparable assemblies. Specifically, this includes all sub-assemblies and assemblies containing cadmium plated parts in combination with organic materials.

Positive retraction
against full ram pressure
... even when
COMPLETELY ICED!

RETRACTABLE
AIR
INTAKE
SCREENS

Smith-Morris retractable intake screens are constantly tested to insure resistance to airplane performance. In constantly developing the retractable air intake screens, Smith-Morris has again provided a solution for tomorrow's need today.



There is a screen designed to keep debris out of sensitive jet engines and one that is retractable even when icing conditions are severe. It is equipped with self-cleaning duct doors for retraction of drops of evaporative moisture, and the latter locking mechanism makes it impossible to extend duct doors when the power plant is operating. Complete information furnished on request.

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FERRISDALE 20, MICHIGAN

Systems Engineering

Guided missiles experience aids Martin in implementing this airplane design concept

Guided missiles were the first aircraft to bring together speed—the first to require the close design integration of components which The Glenn L. Martin Company calls System Engineering. Today, with guided missiles also joining the more faster and being assigned increasingly difficult missions, it is essential that they, too, be designed as integrated air-borne systems, not merely as flying vehicles whose role and assignment.

With a background of demonstrated accomplishments in top level, missile projects and aerospace growth in the field, The Glenn L. Martin Company has turned over Systems Engineering from its senior to its junior to its up-and-coming. The Martin engineering staff has been shaped and trained to provide proper emphasis in all phases of the basic types of functional elements involved in the production of a modern airplane—airframe and power plant—electronic flight and navigation systems—and military armament or passenger facilities.

Martin Systems Engineering recognizes that the immediate problems of personnel and engineering, as well as economic and mechanical aspects, are the software design to produce a truly efficient military weapon. And whether the weapon is a guided missile or a guided aircraft, it is important that the design team be so indoctrinated that the end product represents a completely coordinated system. There is no advantage in having an airplane ready for flight testing while the guidance systems, which may become the greatest danger, are at a standstill in the designer's eye.

That is Martin Systems Engineering. This is a truly modern, comprehensive, systematic effort, utilizing computer and systems experts—as well as aerodynamic, structural, mechanical and electrical, hydraulic, armament and power plant specialists working in close coordination with the designer's eye.

That is Martin Systems Engineering. This is a truly modern, comprehensive, systematic effort, utilizing computer and systems experts—as well as aerodynamic, structural, mechanical and electrical, hydraulic, armament and power plant specialists working in close coordination with the designer's eye.

Martin Aids Tell Air Power Story
Particular emphasis of interest, also American aerospace modern, system administration also has our highlight as our important role in our country's present and future progress and survival after survey has demonstrated that there is no other way to progress except as increasingly high technology.

The general public and business circles are reaching through the pages of *Time*, *Newsweek* and *Aviation* as well. The same and women who write and edit the news are kind agents of being disseminated through *Editor & Publisher*, *Aviation*, *Photo* and *Publisher's* *Aviation*.

New Navy Sub-Hunter Turns on a Dime!



USSA-100, the first of a new class of Navy sub-hunter, is shown in flight.



A comparison of the USSA-100, the first of a new class of Navy sub-hunter, is shown in flight.



Martin Aircraft Company, Inc., is the manufacturer of the USSA-100, the first of a new class of Navy sub-hunter, is shown in flight.



A comparison of the USSA-100, the first of a new class of Navy sub-hunter, is shown in flight.

Hydrofoils allow advanced base flights from sustained bodies of water—provide safer operations from complex tenders—improve maneuverability in air-sea rescue

A pair of hydrofoil sub-hunters, the USSA-100, is shown in flight. The aircraft is a high-wing, multi-engine plane with a large fuselage and a tail section. It is flying over a dark, textured surface, possibly water or a simulated sea.

Hydrofoils are just one of the advanced features of the modern, sub-hunter aircraft. The USSA-100, the first of a new class of Navy sub-hunter, is shown in flight. The aircraft is a high-wing, multi-engine plane with a large fuselage and a tail section. It is flying over a dark, textured surface, possibly water or a simulated sea.

The USSA-100, the first of a new class of Navy sub-hunter, is shown in flight. The aircraft is a high-wing, multi-engine plane with a large fuselage and a tail section. It is flying over a dark, textured surface, possibly water or a simulated sea.



JET-FLIGHT CONDITIONS TO ORDER

The altitude chamber is one of a pair of units used for conditions in the new, 1311 cubic foot, high pressure chamber at NASA's Lewis facility at Cleveland, Ohio.

designed to accommodate powerful jet sub-engines, chamber has capacity of 131,000 cfm. of high pressure air at 500 and reduced and full loads 1,000,000 cfm.

New Fire Aids Developed by CAA

Two new aircraft fire safety aids have been brought out of the Civil Aeronautics Administration's Technical Development and Evaluation Center at Indianapolis.

One of the developments, a flame-inhibitor reference scale, will help in locating out low flammable hydrocarbon fuels and leaks. Function of the scale is to set up pyrolytic, which is then what percentage of a certain combustible reference fluid (hydrocarbon) is contained with the test fluid. The scale measures the rate of the flame's change in length when the reference is changed through an oxygen-rich flame at 1000 psi.

Flame-inhibitor Ratings—This, a fluid which requires no hydrocarbon reference is considered non-flammable and is

given a non rating. Increased safety would ensue increasing flammability. According to the scale, gasoline would have a rating of 50, some hydrocarbon fuels, 75, kerosene and 80, while some of the newly developed hydrocarbon fuels carry ratings from 80 down to zero.

New Gauging—Design requirements for an automatic device for self-testing coupling for fuel lines were formulated after tests on an experimental model. Data from these CAA tests already have been made available to those coupling manufacturers who will use the information to construct improved equipment and for further testing at CAA's Indianapolis center.

As previously stated, the coupling are intended to disengage automatically with a 75 psi pull at any angle up to 55 deg., locking off the ends to prevent the fuel. Locking off is accomplished simply by pushing the ends together.



for Aircraft

FOR BEST RESULTS USE THESE ACCURATE, RESPONSIVE, STURDY TEMPERATURE-SENSING ELEMENTS WITH LEWIS RESISTANCE-TYPE THERMOMETERS.



DAMPENS BOAR OF 94

Chair Martin aircraft suffers loss of 94 in plane's engine a run at full throttle, with sub-hunter a superior at Lockheed Aircraft Corp's Van Nuys plant. The aircraft is a high-wing, multi-engine plane with a large fuselage and a tail section. It is flying over a dark, textured surface, possibly water or a simulated sea.

was mounted to water line. Spray code the 3500-amp and 200 amp level below exhaust system allowing chamber. Later a head with 1000 amp was used to test the aircraft's engine at full throttle. The aircraft is a high-wing, multi-engine plane with a large fuselage and a tail section. It is flying over a dark, textured surface, possibly water or a simulated sea.

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EQUIPMENT

Volume Overhaul of Aircraft Components

PanAm's Miami base spends more than \$1.5 million a month.

By George L. Christen

Miami-Pan American World Airways' Miami Overhaul Base is known as the world's largest aircraft overhaul center. It is probably also the most self-sufficient.

If W. Tinsley, division manager of Pan Am's Latin America division, points out that the only significant portion of his company's fleet of aircraft which does not come to MOB for complete overhaul and servicing is made up of the planes assigned to the Pacific Asia division, based in San Francisco.

The Component Overhaul Base, vital adjunct to MOB, overhauls, maintains and repairs every component on PanAm's large and diversified fleet of aircraft flying the North Atlantic and Central and South American routes. Exceptions are the General Electric turbojet engines charged out on the Boeing 737s owned by subsidiary companies.

► **Look at the Record:** These statistics will give substance to the status of PanAm's Miami overhaul.

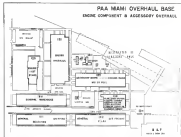
Number and types of aircraft whose engines, propellers and components are overhauled at MOB: Boeing 747-200s, 18; Lockheed Constables, 30; Douglas DC-7s & DC-8s, 39 (of which 12 belong to subsidiary companies); Cessna 340s, 16.

These planes carry four different types of engines: the Wright R-3350, and the Pratt & Whitney R-2800, R-4360 and R-2000.

Employing 697 persons, MOB is currently turning out overhauled engines at 6 per year, R-2000, 6 per month; R-2800, 2 per week; R-3350, 6 per week; R-4360, 5 per week.

The bill is in proportion to the size of the base. In October, 1950, a typical month, MOB overhauled \$4,627,669 of engine time. This figure broke down as follows: material, \$354,241 (of this sum, \$311,487 was for engine oil and overhaul); PMA oils & fluids, \$463,399; and labor, \$3,810,029.

On a yearly basis, PanAm supplies 3000 workers without annual payroll addi-



up to \$20 million. The company spends about \$5 million for fuel and supplies.

PanAm's Miami base, with 30 acres under roof, handles over half a million passengers and 15 million in all types a year.

A tour of the COB portion of the base under Tinsley's guidance, produced the following information.

► **Plating Shop:** Roster has rollers, at one time a hot-chamber die-cast of the R-2000 and R-2800 engines, have been all but discarded. PAA custom-makes and plates the roller arm supports used in these engines, combining the plating tolerance in 2/16,000 in. Plating is aqueous on the steel spacers it supports for bending purposes, then silver.

M. H. Decker, manager of the plating shop, said that PAA has had excellent results with reground and replaced main and rod bearing caps. He added that his company was the first to initiate plating these parts in 1944.

Decker believes that PanAm gets its plating done more than any other airline. Here are some typical plating jobs:

► **Chrome:** (the most important), 75 per cent of all chrome plating is done for engine purposes. When engines are ground to an oversize dimension, plated to an oversize dimension, then finished to the exact size when new they return not originally chrome plated are new dimension because of the metal's excellent wear characteristics.

Decker estimated that the money saved by chrome plating parts and turning them to service rather than regrading them to the peak help part for the rotor plating shop.

Typical parts given the chrome treatment are propeller and crank shafts, hydraulic cylinders and pistons, landing gear struts.

► **Silver:** Restores such items as roller arm spacers, blocks of master and bearings.

► **Lead-tin:** Used to surface master rod bearings on the R-3350 engine.

► **Copper:** Restores bearing caps.

► **Die:** Restores replacing of last-plated parts prevents galling and corrosion.

► **Calcium:** Primarily a corrosion protective.

The plating shop maintains its own laboratory where plating solutions are tested periodically to make sure that the solution is correct.

Decker attributes part of the success PAA is having with its chrome-plating plating to the conference model used in the plating bath. The model, cut to size to conform to shape to the parts being plated, are engineered and fabricated by PAA.

► **Radio Shop:** Failure of the 110 ARJC 1 VHF radios used on PanAm's aircraft have been reduced from 75-68 a week to 2-3 by the replacement of the GARC tube with the replacement 5094 tube.

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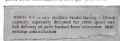
Hufford Stretch-Wrap Forming Machines cut costs by increasing hourly output, improving accuracy and uniformity, minimizing spoilage and scrap, and cutting tooling and operator expense. Many modern Hufford machines successfully form both sheet stock and extrusions and are made in a wide range of work capacities and to ranges. Typical models are illustrated, others available. Write for description data and quotations.



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Sperry engine analysts on a crash to maintain that the A-12's automatic pilot poses some nasty problems.

Engine steps-Mcgrath problem is the R-4350 engine. Overhaul time has been boosted to 100 hr.

Big improvement is expected when these modifications are completed.

Installation of new, Massachusetts-based valves. Accompanying longer valve gasket will help bear transfer from valve to cylinder, thus reducing valve's temperature and fatigue rate.

Use of longer connecting rod. Piston pin is located higher on new piston reducing stress on piston that. The modification is in progress-series on gins have been completed.

Another problem is exhaust stack failure. No immediate solution is apparent, according to Strain.

Champion R-3781 spark plugs are used exclusively and FAA expressed satisfaction with their performance.

All of Fairchild's 30 C-119s are being converted to accommodate the Stratton cabin supercharger. The airflow obtained resulted with this supercharger installed in its feet at Model 749 Coast/Hudson which were sold to Air Force some time ago.

Leakproof Valves

A generalized leakproof line of check valves for hydraulic and pneumatic applications has just been put on the market by James-Pend-Clark, industrial air engines of Pomona, Calif.

Features of the valves, according to the manufacturer are absolute sealing, automatic flow resistance, and leakproof dependability plus quick opening and pressure closing at all pressures.

The company says it has spent five years developing and refining the design called "Circle Seal." Heretofore the seal was produced only in a custom form.

Opening pressure for standard types is 1 psi differential for low pressure valves, 4 in. of water. Poppet close at zero flow before return flow starts, the company says.

Think of making the valve leakproof is one of synthetic rubber "O" ring between the seated portion on the poppet and the valve body. As has pressure increases, seating stress becomes more positive. The seal seals while pressure loads on the poppet are carried by a metal shoulder in the valve housing (see drawing).

The company claims low maintenance for the valve because the seated rubber "O" ring absorbs most of the closing shock, reducing wear and tear alignment of the poppet and body.

Another particle coming between poppet and seat is wiped away by the "O" ring. If damaged, the seal may be replaced easily without special tools.

NEW AVIATION PRODUCTS



Valve Saves Fuel

A spark advance control valve, designed to increase flying range by cutting fuel consumption up to three percent, is being marketed by Adel division of General Motors Corp.

As a bonus, the valve also increases life of superchargers and exhaust catalyst units by reducing supercharger temperatures, the maker claims.

Designed for mounting on the engine, it is a three-way, two-position, solenoid operated type. When electrically actuated by remote control, the valve directs flow of engine oil under pressure to an actuating cylinder. The cylinder, in turn, advances engine ignition spark, which is automatically retarded when the control valve is de-energized.

The device, No. 23951, is described by its maker as being simple constructed—only three screws need be removed for disassembly—light in weight and compact. It's completely sealed and designed to withstand extreme vibrations. Rated operating pressure is 100 psi, while operating pressure range is 5 to 200 psi. The solenoid is a 10-watt dc continuous duty type. Valve dimensions 3 1/2 x 2 1/2 in. Address: 10777 Van Over St., Burbank, Calif.



Lightweight Motor

A reversible, miniature induction motor, rated at 1/50 hp and weighing

only 10 oz., has been developed by Eastern Air Devices, Inc.

According to the maker, the unit, designated JHD-16, meets all important JAN specifications and "can save for the first time be trusted to meet Air Force Hermetic Specification #14553 Method 12." The motor originally was designed for continuous duty driving of a 3-in. diameter Torington fan blade, Model 8-327-4-S. It operates on 208v., 1 phase, 400-cycles, at rated at 1/50 hp., 8.15 amp., 10.0-00 rpm, and measures 1 1/2 in. in diameter and is 1 1/2 in. long. Address: 595 Dean St., Brooklyn 17, N. Y.

ALSO ON THE MARKET

Mobile hot-weld test stand will produce temperatures from -75 to 235 F. for testing aircraft components measuring up to 6 x 6 x 6 in. Compact miniature size enables efficient adjustment and has flexible conductors for power and water supply. Made by Electro-Mechanical Division of General Electric, Milwaukee, Wis., 12255 W. Devon St., Detroit 25, Mich.

Dynamometer measures torque developed by power sources rated from 1/2 to 10 hp. Device dissipates 4 hp. continuously at 1600 rpm, may be used at any speed from 0 to 6000 rpm. It weighs 130 lb., has handles for carrying by two persons. Made by Avion Instrument Co., 121 E. 24 St., New York 10, N. Y.

Flange type toggle clamp positions and holds beams used in place at pressures up to 4000 lb. Unit is made of high-alloy heat treated steel forgings, measures 3 x 4 x 1 1/2 in., weighs 5 lb. 10 oz. Made by Design Engineering Co., 182 Midland Ave., Detroit 3, Mich.

Direct-reading vacuum gauge gives response of less than 1 second, is capable of measuring absolute pressure from 0 to 1000 microns of mercury. Said by maker to be particularly suited for leak detection work in pressure sensitive control systems. Made by Hastings Instrument Co., Inc., Hampton, Va.

Micrometer can be used for all measurements from 6 to 12 in. by means of interchangeable stems. Each of an anvil is machined to show capacity, is fitted with an adjusting screw to compensate for wear. Used cases with anvil, six standards and wrenches. Made by J. S. Stewart Co., Athol, Mass.

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AIR TRANSPORT

Cargo Run Slated for Jet Bomber

Prototype Advisory Committee tentatively agrees to test B-45 first, B-47 next, then a turboprop.

Testing of the North American B-45 jet bomber by its role as a simulated cargo and transport run is expected to be the first flight test project under the new transport prototype program authorized by Congress.

At its first meeting last week, the U. S. Prototype Advisory Committee, meeting in Washington set up a program for testing and type certification which tentatively laid off with tests at the B-45, followed by a plan to enter similar tests with the turbo-propeller Boeing B-47 jet bomber.

Next in line will be tests of cargo craft with turboprop power. The Allison T38 turboprop will probably be first in this phase. It is a current design, now under 248, powered with Allison T38 turboprop, the only cargo turboprop type which has yet flown in this country. It will likely be followed by the new turboprop version of the Douglas four-engine Globemaster II (C-124B) when it becomes available, next year.

Date of the beginning of flight test program depends on Congress which has yet to make available the \$12.5 million appropriation for the testing program, authorized in the last session. It is expected that the appropriation may be completed in time to get started in May.

In the long-range transport prototype testing program, turboprop and freighter and tender aircraft specifications writing have top priority. But since not a single turboprop-powered transport is available for testing this spring the test of a jet bomber on simulated airline operations will be first.

► **Committee Program**—The committee at its first meeting adopted this plan:

- Survey all plane models to be tested first. Specialists will be asked by the technical subcommittee to advise on individual programs. There may be a separate testing group operating with the subcommittee.

- Obtain a target bomber from the Air Force to test on simulated airline operations.

- Establish turboprop installations in transport at the earliest date by means between and the military.

- Ask the military to make turboprop-powered versions of the transports available for testing under the committee's direction.

- Refine specifications to aid aircraft manufacturers in designing a replacement for the DC-3.

- **Air Fighter Program**—The committee has decided on two types of turboprop freighter needed. Most on thousands, especially among the overseas carriers, is for long-range craft with a payload of 50,000 lb or over. Current favorite of this group is the Douglas C-124 Globemaster. The other classification, about, especially in the plane, is a medium-range plane with 20,000-30,000 lb payload. This would presumably be a turboprop DC-6 type or Convair two.

Specs for the larger plane will probably be issued in even longer range and heavier payload. Every one the only by has called for such machines. This year, on Jan. 15, 1949, a prototype working group recommended a heavy long-range cargo plane be developed with a 50,000 lb payload. One day ago a similar group, under Air Commanding General asked for a long-range cargo plane with 50,000 lb payload. Now the prototype committee

quicks of 50,000 lb or more. And Ben Norda told the committee, of which he is a member, that 100,000 lb payload should be developed. Some discussion members agreed with him.

Representing the domestic airlines, Aero Hines told the committee the Chase 121 aircraft transport with turboprop looked like the most economical medium range plane in sight.

Besides the Allison and the Douglas turboprops, there is a possibility that Boeing may build a turboprop version of the C-47. Superbomber, which would also fit into the testing program, although Boeing's main emphasis thus far has been on pure jet transport design studies.

The prototype committee wants to get into a transport program for the turboprop as soon as Allison has completed its first intensive study of power plant powerplant operating characteristics of the plane and the program that all the testing programs will involve using arrangements with the owners of the aircraft.

Support airlines for the committee in the availability of the aircraft. Maj. Gen. M. B. Nelson, USAF, president of the committee, did not commit the service on this point. Obviously availability of the air and turboprop a new from now is subject to some possible military terms.

► **Frederick House**—Based operating in quarters of the freight airlines have already been down up to. Air Transport Union and the freight themselves. (Aviation Week, Nov. 20) No other



NEW STRETCHER LIFT

Now distinctly against rescue stretchers lift developed by Douglas for the C-124 look like looking patients or cargo (AVIATION WEEK Jan. 3). Patients or cargo must level while the lift is in use. Lift is supported by an extending boom 16-in. above the ground through 15 in. above the side door. Action takes less than 15 sec. The

new lift, which has been ordered by MAAG for ambulance operations, weighs less than 240 lb and can be put into operation in less than one minute. Its capacity is two patients or 900 lb of weight. Lift is operated from the cabin or the ground. Power is supplied by an auxiliary engine or electricity from the plane's power system.

searching those specifications is anywhere near the development stage is yet, although some are on the boards.

The broader program involving the contractors will entail the operating requirements of the fociers in that a potential manufacturer will have a good idea what to build. Part of the \$11.5-million test program the contractors for space testing and testing will help that potential manufacturer with his development costs.

Batch fociers planes like the de Havilland Dornier and Ilium, Miles M-40, and P-5000 were partly covered completely by the contractor because of the complexity of U.S. politics and "special interests" involved (Aviation Week Oct. 30).

► **Task-Kit Transport**—The contractor approved previously the plan to place jet fociers in simulated transport operation. They say this plan to find out what they need to know about U.S. jet transport aircraft design, construction, rules, navigation, fuel control, and support considerations.

The place would probably be located by the Air Force by "Technical aircraft assignment" as has been done to CAA. CAA in turn would contract with an airline to operate the plane in the test operation. Although the de Havilland Dornier and the Aero Jet-100 would probably be most suitable for testing in U.S. simulated transport operation, it is assumed the prototype contractor will go as far as possible with American planes.

Between now and May the contractor will concentrate on drawing up detailed plans on aircraft suitability for test, what plans to test, and how to test them.

► **Prototype Air-Tech Prototype Aircraft (Testing) Act, Public Law No. 867**, declares it to be the policy of Congress to promote "the development of improved transport aircraft, particularly turbo-propeller aircraft, aircraft especially adapted to the economical transportation of cargo, and aircraft suitable for frontier operations."

Commerce Secretary Charles Sawyer delegated the authority of administering the act to Civil Aeronautics Administrator Donald Nix. Nix is chairman of the Prototype Aircraft Consortium, with Deputy CAA Administrator Fred Lee in alternate chairman. CAA Chief Engineer Harold D. Hart is a core member of the consortium.

Other members of the committee at the last meeting were: Dolis Tostall, CAA Maj Gen M.B. Nelson, USMC, Director of Research, Office of Chief of Staff with Navy and Army advisors, David Baker, Air Line Pilots Assn., Edmund D. C. Ramsey, Aircraft Industries Assn., Alfred Fra-

ney, S. Ladd, AIA, Assoc. Research, Air Council Transport Assn., Robert Farnett, Flight Tugers, Raymond Norton, Subcontractor, W. G. County, NACA.

Under the act, the group would:

- See what kinds of airplanes are needed. This means preparing broad operating and general utility characteristics and specifications for advanced design prototype aircraft.

How to Fit Nonskeds in the Picture

Large irregulars offer plan for renting their fleets on military contract basis during mobilization.

First industry proposal by the large irregular carrier for utilizing their fleet as a military contract basis was taken up for study by Civil Aeronautics Board Chairman Dolis Tostall last week. The U.S. domestic market is not so large with about 50 two-engine and 150 four-engine transports have no place yet in active mobilization plans. The new plan was submitted by Air Council Transport Assn. President Alan Blumel, to be studied for consideration by the National Security Resources Board Civil Air Mobilization Task Group of which Tostall is also chairman.

Three large irregular carriers are already operating 22 DC-4s on the Pacific shift, partly with planes they charter from domestic nonskeds. If some DC-4s are needed, probably at most all the remaining domestic postal DC-4s would go to the shift through the normal operation of supply and demand.

The domestic carrier would charter these DC-4s by offering the service a better cost for the planes than the domestic skeds can pay with them. This leaves the 67 C-46s and 31 C-47 DC-3s still operating around the U.S. on a shift-mechanism, primarily on air coach and special charter operations.

► **The Nonsked Problem**—The problem is how to fit the planes and crews of these planes into mobilization. About 50 nonsked companies own about two transports each, on the average. Utilization of these planes in the civil economy is very low, by estimate as well as by the nature of their business as "large irregular carriers."

These nonskeds who are getting high civil utilization are generally converting their authority under their CAB companies, and possibly will shortly lose their right to operate at all as their companies come up for renewal by CAB. This is because the exemption of a large irregular carrier operates under its operating "single and infrequent" trips between major cities.

► **Test transport and transport planes** under scheduled air transport conditions, to secure data critical in mobilization, in developing advanced prototype planes.

► **Test planes developed from original specifications** called for by the contractor. ► **Provide for advance experimental confirmation of aircraft** as indicated by the testing program.

Even this mobile fleet of nonskeds as a natural immediate reserve for the military. The planes are also most of the time.

► **One Mobilization Plan**—The plan that the Air Council Transport Assn. proposed for using nonskeds is this:

► **Air Council Transport Assn.** would be the mobilization carrying agent between the military and the approximately 50 nonsked carriers. ACTA representatives would be on hand at all major military mobilization.

► **Through traffic** to and from the military base would be developed first by the ACTA representatives, along with any other traffic by military personnel paid for by the individuals or their families.

► **Official military travel** via their own shifts would be the second step. ACTA would have the military allocate "a preponderance of official domestic military travel" to mobilization air carriers.

► **Tactical use** of mobilized nonskeds would come considerably after D-Day. The ACTA plan states that "military control is considered from the fact it is not thought necessary short of war or total mobilization to transfer all civilian operations for a strictly military operation."

► **However, planning** should contemplate D-Day orders which would put nonskeds directly under close liaison with the military, actually into military units.

► **ACTA points out** that 75 percent of its crews and management would already be in the military reserves. So the need for tactical utilization of the nonskeds could be met immediately. The nonskeds could be organized into reserve squadrons as advance. Their conversion to complete military units and tactical use would be simple.

► **Charter Rates**—ACTA offers two methods of compensation for mobilized services to military bases and their personnel. One is through passenger-rate per person, or there a "contracted military rate" not 1 cent a mile to go by any means be places. That official

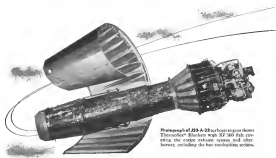
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Photograph of JMS-A-23 afterburner shows Thermoflex Blanket with RF-360 felt covering the entire exhaust system and other burner, including the hot gas turbine section.

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SHIELDING the entire afterburner and exhaust assembly on the Air Force's new JMS-A-23 turbojet engine for the Lockheed F-94A Thunderbolt II fighter required an insulation that could withstand not only terrific temperatures, but high frequency vibration as well.

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The Manville Camosun fiber used in this new felt has excellent stability at 2000°F. Its insulating efficiency is such that a 1½" thick blanket produces a 1500° temperature drop between the hot face and the cold side of the screen when the hot face is in the range of 1900-2000°F. And it so effectively dampens high-frequency vibra-

tion that thermocouple leads, as well as fuel, air, gas, and hydraulic lines can be mounted directly on the blanket, without smaller, lighter clips than previously required.

Thermoflex Blankets are fabricated with the RF-160 felt sealed between sheets of corrosion-resistant Inconel or stainless steel, edge-finished and sewn or spot-welded as required. They are custom-made for insulating entire powerplant assemblies such as aviation gas turbines and exhaust systems and, in addition, protect and fire-proof bearing systems, fluid storage tanks, air conditioning systems, thermal de-icing ducts, etc. Special perforated ducts are also available to fit the intricate surfaces involved in many aircraft and powerplant applications.

For the full story on Thermoflex Blankets and RF-360 Felt, write for Brochure AV-1A, Address Johns-Manville, Box 290, New York 16, N. Y.

Circle 1 on Reader Service

**PRODUCTS for the
AVIATION INDUSTRY**

AA, TWA Luring New Travel Market

Two major domestic airlines have moved into action to tap a new slice of the travel market—the millions of U. S. corporation employees—by promoting incentive schemes. Yearlong, pre-scheduled trips by airline are being promoted for increasing production, upping sales, reducing absenteeism or similar goals.

Contenders for the new patronage are American Airlines with a plan called, *Mileage Air Holidays*, and Trans World Airlines with its *TWA Travel Awards Program*.

None With Differences—American's and TWA's schemes are basically similar, vary in details. Both are designed to induce corporation employees with the idea of piling up points that become redeemable for trips on the respective airlines—to many points with TWA. TWA's points awards trip only, AA's also includes merchandise points that tie in with travel, such as cameras, luggage and the like. For instance, in AA's plan a three-day visit to Mexico, complete with transportation, hotel accommodations and food would require collecting 387 points.

Three separate angles are involved in handling *Mileage-Air Holidays*, AA which will sell the plan to corporations and furnish the air transportation, Gulf States Corp., St. Louis, Mo., which conceived it and will furnish the promotion materials necessary to keep the company going, and American Express which will take care of necessary ground transportation involved in the tour.

The TWA Travel Awards program originated within the airline about three years ago but has only recently been revived and put into action. TWA will handle the main burden of the contest, selling the idea, furnishing an transportation, providing promotion items and will arrange with local travel agencies to take care of ground transportation and accommodations.

The Market-Share leading U. S. corporations awarded over \$15 million in incentive plans last year, both carriers are enthusiastic about the possibilities of their plans. And with production efficiency becoming a major factor in today's burgeoning defense program, they see no major market.

The motive behind the plan is easily found in the new competitive forces that have become apparent in the domestic market. Since American pulled out of the personal business with the sale of American Overseas to Pan American, it has been able to establish its focus in building up domestic base. However, this emphasis naturally can't afford to watch the trend disinterestedly—that the smaller carrier by

TWA with its own incentive program.

Space Available—Neither airline says any difficulty in being able to supply seats for the passengers despite any possible increase in traffic because of the defense program.

No Decision Yet on Cross-Country Route

The *Eastern* Civil Aeronautics Board is still mulling over the Southern Service to the West now, according to Chairman Edgar Rensel.

Eastern Air Lines is the leading contender for a Miami West Coast Route, recommended by CAB Executive J. Earl Cox. American Airlines is fighting Eastern's application, claiming that its existing Atlantic Delta service is enough, or through travel on their interchange as that.

Reports recently that the Board would decide against the application of Eastern and others for a through route are incorrect, presumably based on Rensel's statement of policy and action. In his statement, Rensel mentioned that one Board policy was to reduce transline competition, to protect routes corner self-sufficiency. The proposed Eastern transcontinental route would be competitive primarily with American and Delta.

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corp planes would make these capable of tempering pilots as well as dogs. Mixed cargo and passenger loads should give little problem, as solutions from healthy personnel could be what the patient requires most.

The study at MATS even showed that only seven percent of the case reports revealed symptoms of any kind during flight. Most symptoms were due to effects of motion, altitude or the air itself. They were minor symptoms and not a single ill after-effect was reported. Single treatment allowed the occupants in 97 percent of the cases. Most frequently, the patient was merely asked to lie down. Only one percent required medication. This consisted of such simple measures as aspirin and anti-nausea pills.

Less than one percent of the patients were referred for an evaluation. On the matter of patient eligibility for air transport, the factors appear to be: The effects of air travel on certain diseases and injuries must be viewed critically and each case considered individually. The effects of ascent to altitude may have profound effect on certain pathological conditions.

The report was prepared by Col. B. A. Strickland, Jr., USAF Medical Corps, and Dr. James A. Rufferty, Randolph Field, Tex. It appeared in the Jan. 29 Journal of the American Medical Assn.

CAB Revokes Arrow Registration

The Civil Aeronautics Board was on over-extended "one scheduled" flight by large irregular carrier continues. CAB has revoked the registration of Arrow Airways, Burbank, and a CAB spokesman recommends the same for Air Transport Associates, of Seattle.

Arrow's letter of registration is scheduled as of the middle of next month. After Feb. 15, Arrow is ordered to cease and desist from engaging directly or indirectly in air transport. Reason for the revocation is that Arrow was found to have conducted a regular air service between Los Angeles and New York, and Burbank, and New York. The company is also said to have told the public it was conducting regular service.

The Board opinion states, among other things, that Arrow's attitude has been one of defiance or at least of studied indifference. To Part 291 of the Economic Regulations and Section 401 of the Civil Aeronautics Act.

An Air Transport Associates-CAB Economic Warfare Unit. It also recommends that the Board revoke the registration of Air Transport for similar reasons. The defense put up by the accused is interesting. It says that although

most of the traffic may have been actually bound for the cities of Seattle and Burbank, the planes sometimes went to and from the "point" Boeing Field, Seattle, and sometimes the "point" Fane Field, Everett. Fane Field is 30 miles from Boeing Field. Section 291.3 of the Economic Regulations says "the best point" ... shall mean any airport at place where aircraft may be loaded or taken off, including the area within a 25 mile radius of such airport or place."

The company contends the service was from Anchorage to the point Boeing Field and to the point Fane Field which, being more than 25 miles apart, are separate destinations.

CAB requires that there be prolonged stops in service if a scheduled is providing frequent service between two points at intervals. If the respondent company in this case can connect Boeing Field and Fane in separate points of destination, it should within the law. However, the legal interpretation by the examiner is that the second point is Seattle, served by both airports.

Another argument by the company is that the frequency approached regularly only because customer demand and load dictated the schedule of a non-scheduled carrier.

SHORTLINES

► **Air Lines**—Fresh traffic carried 332,500 passengers in 1950, 34,000 more than 1949. Freight increased 35 percent to 2149 tons.

► **American Airlines**—The airline's wage and benefit dispute with its pilots goes now to a Presidential-appointed arbitration board. ... Company pilots completed 99 percent of their scheduled flights in December—an all-time record for the line.

► **Aviation**—The Colombian carrier carried 506,083 passengers in 1950, up 28 percent over 1949. Cargo—94,076 tons—was up 20 percent. ... Company may buy a third Constellation. It has sent orders to train in the U.S. for two months using the two Consts just bought.

► **Civil Aeronautics Administration**—CAA sends 70 aircraft communications and 50 communication technicians to work on the 8000 miles of survey in Alaska. Salvage began at \$1075 (including "insurance" pay differential) and go up to \$5750.

► **Latin**—Second largest Colombian air line carried 216,337 passengers, up 11 percent in 1950. Cargo was up 60 percent over 1949 to 42,114 tons. Latin goes to CAB hearings early next month.

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valves, and pressure controls.

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► **Western Air Lines—**Company is using radio ads inviting people in Detroit to snowbound areas to write the line for travel and pilot information. The plan proved successful around Billings, Mont., and so has been extended.

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EDITORIAL

GAINING PERSPECTIVE—The industry sets out on another hectic build-up. Details seem to creep in and slip out our nation. That's why Chester Loening's recent Wright Day message was timely. Mr. Loening isn't popular in some air circles. But he speaks his mind fearlessly. Aviation needs more diversified, experienced critics "in this propaganda-ridden era of half-truths, twisted truths, and glibbed misrepresentations on an issue as vital as Mr. Loening's." We're sure that if you, Editor, whose daily job it is to try to sift truth from propaganda and whose know-how will how truly he speaks.

He stresses that with the industry at its present size "we lose perspective that we can regain only by having a constant in our headlines give truthfully to appraise our deficiencies and then see where the future is likely to lead us."

The speaker's comments deserve wider circulation than they have been given.

Landing Speeds—Higher landing speeds, Mr. Loening believes, are our first failure to improve the airplane. "As a result, we have added the aviation business, both civil and military, with the increased real estate expense burden of huge airports, with constantly present hazard on landing, increasing headaches on stalled up traffic, and discouraging landings on wide personal use of aircraft."

First Generation—Is that first only generation that I witnessed, how very slow and stupid we were in failing more quickly and eagerly to take up the turbo-propeller type, the simpler and faster monoplane, all-metal construction, amphibious, wheel basket, variable pitch propeller, wire landing flaps, closed cockpit. All these features were being pioneered for years and yet few were interested.

Today's Generation—In this second generation, 1935-1950, this present engineer and manufacturer side if we have not been equally blind and stubborn "in not vigorously taking up air organ development (even with Berlin and Korea to pull us), in pushing the helicopter and its convertible version, not only for use but for short land in concrete, in utilizing the new implications in jet engine airplanes when ski-equipped; in developing control forces other than by movable flaps, in providing gust load alleviation both for the safety of the airplane's hard stressed structure and the comfort of the occupant in various devices, including induced air flow, to slow the fastest phase down the landing; in providing more simple emergency protection in cabin for personnel; and how slow we have been to realize that its outrageous noise makes the airplane anything but a good neighbor."

The 1970 Phase—In 1958-60, Mr. Loening says we have done well, but many shortcomings and goals

are hidden by military security. However, he expects the 1970 airplane to look like this:

It will cruise 1200-1300 mph, be extremely smooth, gentle, land almost vertically, be built largely of titanium, have an auxiliary engine for taxing and have its controls effected by air flow (rather than flaps, due to the slow speed requirement), have a landing gear suitable for either land, water or snow, have variable sweepback, incorporate gust alleviation structure and seat springs to take the heavy air bumps at high speeds, fewer instruments for the pilot, many more automatic operations, and above all it will be designed in cruise.

New Ideas—To accomplish these results, however, and others such as eliminating weather as a hindrance, "we must give utmost encouragement to the young engineers with new ideas and recognize that old ones and institutions are present also in aviation, and are a greater drag than in other fields, because air progress moves so fast."

"We must also preserve competition, particularly in research, otherwise talent will wither under the too authoritative eye of the commanding officer. And above all, we must not draft promising technicians and take them away from that essential life stream of technical production to be killed in a headline because technical production to protect them failed."

Other Progress—Aircraft will carry "intercom" traffic in 1970. Extension of aircraft range slowly "is transcending anything we have ever dreamed of, particularly when we presently enter the atom-atom engine era, which will exceed the jet engine era." Safety is improving.

Cost—What seems not to improve, Mr. Loening adds, is the constantly increasing expense involved in developing aircraft and their components, and in using them. But "higher expense is not a detriment if higher enough value in operation is given at the same time."

Science & Politics—Aircraft range will continue to bring great technological and political changes in inter national relations, and it is a high time that the progress that we in aviation are engaged in should be relaxed by the Foreign Offices of European nations and of our own.

Human Thinking—So, says Mr. Loening, let's return to the straight thinking of the Wright Brothers. "To the indication that honest thinking is always the winner in a contest with progress. Then, only, will we solve our present limitations."

Good advice for the stout opponents in our industry: adjust too.

—Robert H. Wood.



The Bridge That Flew To Korea ... Overnight!

All bridges across the Han River had been destroyed by retreating North Korean Government armies, halting up the United Nations advance. We needed to bridge the Han in a hurry.

Back in Japan, U. N. troops prepared a 226-ton, 600-foot pontoon bridge—in sections—to fit into the U.S.A.F. Combat Cargo Command's Fairchild C-119s. Piece by piece, plane by plane, they flew

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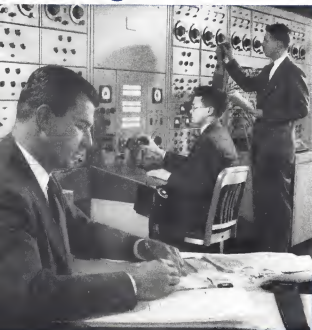
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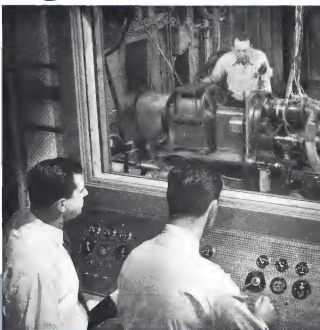
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Flight testing an idea



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A model then gets a long rugged workout in the Aircraft Systems Test Lab to iron out final kinks. When design is "right," production begins. Finally, individual component parts are tested before installation in your aircraft.

Project engineers are chosen for experience as well as scientific "know-how." Pilots, navigators, flight engineers, military and transport, are represented. George Phillips, for instance, shown "flying" a distribution network, is an ex-Air Force maintenance officer.

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